PALEONTOLOGY.—*Remains of Devonian fishes from Texas.* David H. Dunkle, U. S. National Museum,[1] and John A. Wilson, University of Texas.

Two papers on Paleozoic rocks of central Texas (Cloud, Barnes, and Warren, 1945, and Cloud and Barnes, 1948) include description of rocks of uncertain age containing bones which are herein identified by Dunkle as Upper Devonian. First mention of the bones is found in Cloud, Barnes, and Warren (1945, p. 174): "A slab of conodont- and bone-bearing calcareous and phosphatic rock (16-T-33D)[2] was found and collected by Barnes and Warren while they were mapping the Ordovician-Carboniferous contact near Elm Pool, Blanco County, on May 14, 1942." Somewhat later "three other localities were found at which similar conodont- and bone-bearing rock occurs: 16T-2-25B, 16T-1-32C, and 16T-2-27_1A."[3] Conodonts from the original bone-bearing slab were determined by W. H. Hass (memorandum to H. D. Miser dated March 2, 1945) to be of both "Mississippian" and "Devonian" types. Macrofossils from the third locality were recognized positively by Dr. G. A. Cooper (letter to Cloud, February 27, 1945) as of earliest Mississippian age. The conclusion drawn by Cloud, Barnes, and Warren (1945) was that the conodonts and macrofossils (invertebrates) dated the rocks in question as earliest Mississippian.

The extensive report of Cloud and Barnes (1948, dated 1946), "The Ellenburger Group of Central Texas," contains additional information concerning the bone-bearing beds. Cloud and Barnes (1946) elevate the Ives breccia of Plummer (Bullard and Plummer, 1939) to formational rank. The relationship of the "bone bed" to the Ives breccia is described (Cloud and Barnes, 1946, pp. 46–47) as follows: "Locally, the breccia seems to grade laterally into or to overlie or underlie a reddish-brown, olive-gray, brownish, or yellowish impure limestone or phosphatic rock containing conodonts, fragments of bones, phosphatic pellets, and sand grains. Apparently more than one "bone bed" is involved, but relationships are obscure."

The purpose of this paper is to present what small amount of information is obtainable from the bones and the implications that can be drawn from them.

Dinichthys cf. **terrelli** Newberry

The recognizable remains include six fragments of the dermal armor of a large placodermatous fish. Four of these six broken and eroded pieces of bones, all from locality 16T-2-33D, can be readily identified as characteristic portions of arthrodiran plates, a fragmentary left paranuchal (Fig. 1), a left suborbital (Fig. 2), a left inferognathal (Fig. 3), and a right interolateral (Fig. 4). Comparative examinations prompt provisional reference of the four to a form closely allied to the well-known brachythoracine *Dinichthys terrelli* Newberry. The present materials are illustrated imposed on outlines and appropriate sections of complete elements of the latter species. For the purpose of this note further description is unnecessary.

Fig. 1.—*Dinichthys* cf. *terrelli* Newberry (U.T.-B.E.G. no. 40100): Left paranuchal plate fragment in internal aspect. Reproduction approx. × 2 5.

[1] Published by permission of the Secretary, Smithsonian Institution.

[2] The Bureau of Economic Geology, University of Texas, uses a system of locality numbers in which each of the 254 counties of the State is assigned a number, Blanco County being number 16. The "T" stands for Texas, and the remainder of the number designates the position within a county as recorded on aerial photographs for central Texas.

[3] Locality descriptions are given in detail in Cloud, Barnes, and Warren (1945) and in Cloud and Barnes (1948).

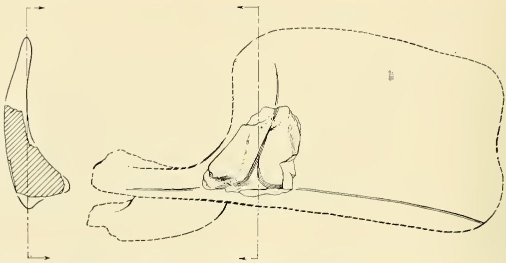

FIG. 2.—*Dinichthys* cf. *terrelli* Newberry (U.T.B.E.G. no. 40100-3): Left suborbital plate fragment in transverse section and lateral aspect. Reproduction approx. × 2/5.

It is not possible here to make more than a tentative identification. This fact is not due alone to the fragmentary nature of the material but must be coupled with various questions concerning the basic status of *Dinichthys terrelli* and its relatives. *D. terrelli,* as now recognized, is restricted to the Upper Devonian Ohio Shales formation. It, with the species *intermedius* and *curtus,* from the same strata, comprise a series of advanced *Coccosteus*-like forms, which by virtue of the numerous modifications discussed by Dunkle and Bungart (1946) is quite distinct from all the other so-called dinichthyids of the Ohio Shales (that is, *Dinichthys herzeri, Gorgonichthys, Heintzichthys,* and *Holdenius*). Though meagerly elaborated by Orvig (1951) it is possible that some of the same features noted by Dunkle and Bungart (1946) motivated Stensio's (1945) separation of the brachythoracines into the orders Coccosteiformes and Pachyosteiformes. Thus, regardless of the taxonomic value placed on the recognized differences, it is necessary that all *Dinichthys* species from North America be examined to ascertain with which group each is related. Until the task is completed, these materials from Texas can have little use in definitive stratigraphic correlations.

Arthrodira, gen. and sp. undet.

Two fragments (Fig. 5) (from locality 16T-1-32C), presumably of the same identity, are unique in the possession of extremely large denticles arranged in a single row along one of their margins. Both specimens are too fragmentary for a complete description. They are, however, relatively low asymmetrical structures with robust elliptical cross sections. The teeth are recurved, slightly compressed, indicated to be variously spaced and to vary in height from one-half to one-third the depth of the supporting

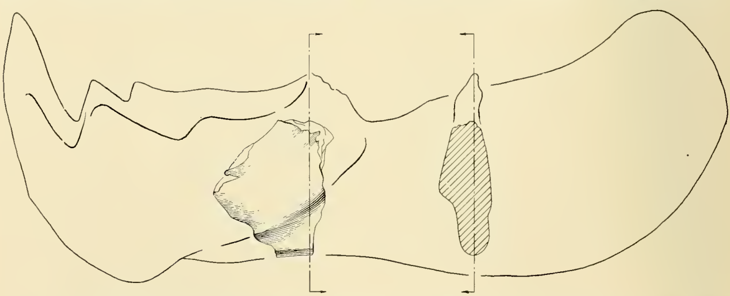

FIG. 3.—*Dinichthys* cf. *terrelli* Newberry (U.T.B.E.G. no. 40100-2): Left inferognathal plate fragment in lateral aspect and transverse section. Reproduction approx. × 2/5.

bone. They appear as projections from the bone, becoming dense and containing a pulp cavity distally.

The gross histology and over-all construction of the specimens suggest an arthrodiran mandible with teeth, rather than an ichthyodorulite. Among arthrodires with large teeth and long, low mandibles are the upper Devonian genera *Diplognathus* and *Tracheosteus*. These latter, unfortunately, are also incompletely known and it seems best to postpone identification of the Texas material.

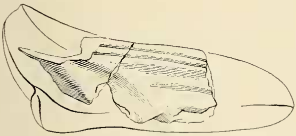

Fig. 4—*Dinichthys* cf. *terrelli* Newberry (U.T.-B.E.G. no. 40100-1): Right interolateral plate fragment in anterolateral aspect. Reproduction approx. × 2/5.

DISCUSSION

If later work shows that *Dinichthys terrelli* and its relatives are restricted to the Upper Devonian Ohio Shales formation, then the *D.* cf. *terrelli* fragments from Texas do have significance stratigraphically. That they occur with Mississippian invertebrates and conodonts seems to be proved. Where they came from, however, has not been mentioned in the literature. If a short-lived sea of Upper Devonian age occupied the area just prior to Ives breccia time and deposited a thin mantle of soft easily erodible material (that is, shale) in which the bones of the placoderms and the Devonian conodonts would be the most resistant structures, then a source for the reworked bones and conodonts would be available. This hypothesis would not seem to conflict with the reasoning of Cloud and Barnes (1948, pp. 48–49) if the long period of weathering necessary to free the chert of the Ives breccia is assumed to have taken place prior to the invasion of the supposed sea.

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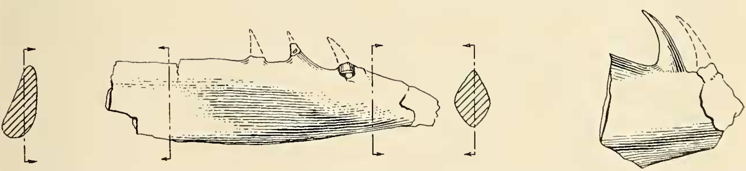

Fig. 5.—*Arthrodira*, gen. and sp. undet. (U.T.B.E.G. no. 40101): Fragments of dentate mandibular elements in transverse sections and lateral aspects. Reproduction approx. × 9/10.